

EMC 451 Advanced ECG Interpretation

Basic Concepts

EMC 451 Basic Concepts

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Course Objectives

Upon completion of this course, the student will be able to:

- Describe the basic electrophysiological principles of the heart, including action potential, vectors, and axis.
- Describe the procedure for acquiring a 12-Lead ECG.
- Describe the properties of the normal 12-Lead ECG.
- Identify atrial and ventricular hypertrophy on the 12-lead ECG.
- Using the 12-Lead ECG, differentiate between ventricular tachycardia and supraventricular tachycardia with aberrancy.

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Course Objectives continued

- Identify ventricular conduction disturbances on the 12-Lead ECG, including:
 - LBBB
 - RBBB
 - LAFB
 - LPFB
 - 1°, 2°, and 3° atrioventricular block
- Using the 12-Lead ECG, identify the pre-excitation syndromes, including
 - Wolf-Parkinson-White Syndrome
 - Lown-Genong-Levine Syndrome

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Course Objectives continued

- List and discuss the acute coronary syndromes and their management.
- Using the 12-Lead ECG, recognize and localize myocardial infarction.
- Discuss the effects of various medications on electrophysiology and their appearance on the 12-Lead ECG.

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Course Objectives continued

- Using the 12-Lead ECG, identify the patterns associated with various medical conditions, including
 - Electrolyte disturbances
 - Pericarditis
 - Pericardial effusion
 - Pulmonary embolism
 - COPD
 - Q-T prolongation syndrome
 - Hypothermia
 - Pericardial tamponade
 - Increased ICP

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Unit Objectives

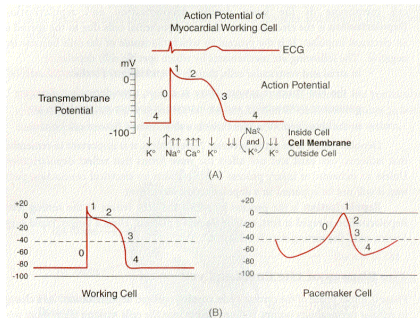
Upon completion of this unit, the student will be able to:

- Describe the electrical conduction system of the heart.
- Describe the genesis of the action potential.
- Describe the ECG Leads and electrode placement of the 12-Lead ECG.
- Describe how to acquire the 12-Lead ECG.
- Discuss the vectors of the heart.
- Name the waves and segments of the ECG.
- Describe the properties of time and voltage on the ECG.

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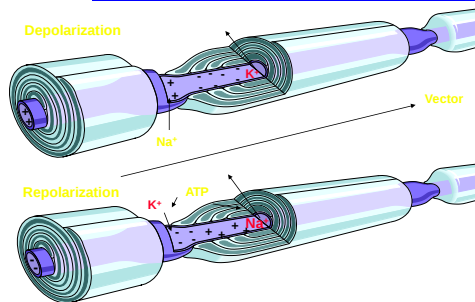
Action Potential



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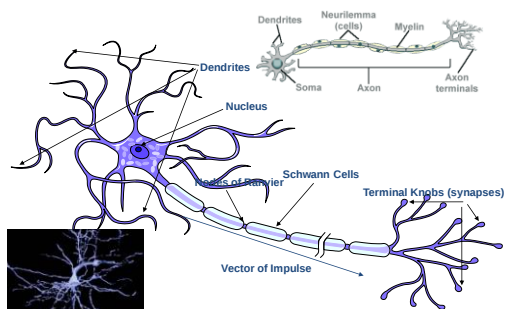
Depolarization, Repolarization



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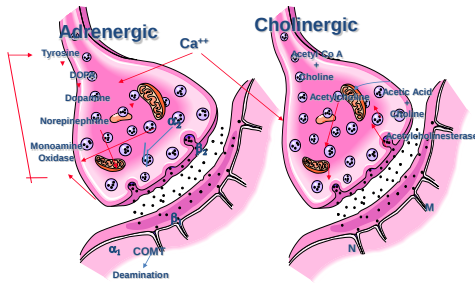
Neuronal Transmission



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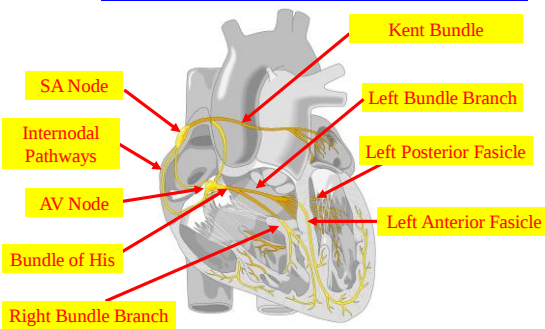
Autonomic Synapses



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Electrical Conduction System



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Control of Heart Rate

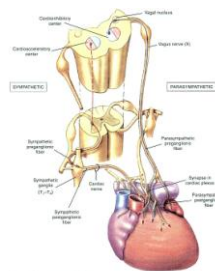
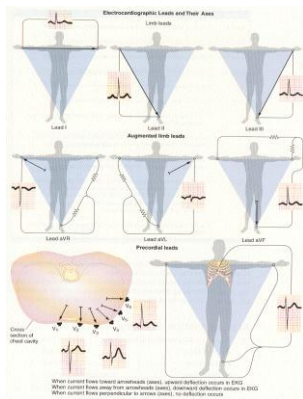


Figure 2-2 Neural control of the heart

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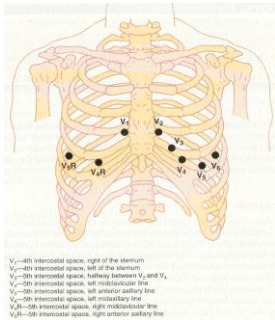
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Lead Placement



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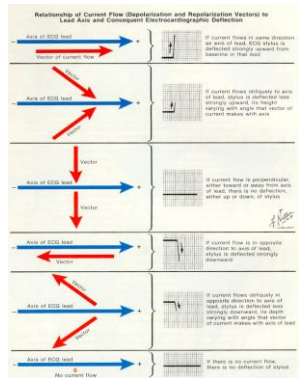
Lead Placement continued



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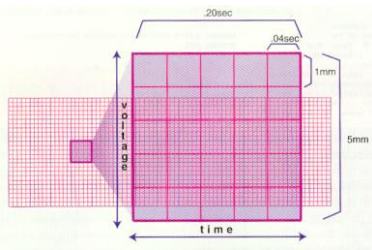
Electrical Vectors



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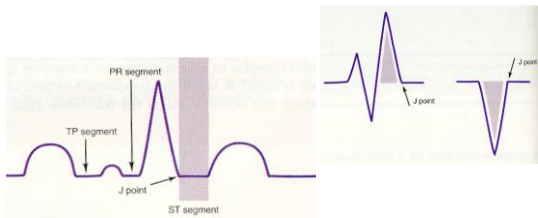
ECG Paper



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Naming ECG Waves and Segments



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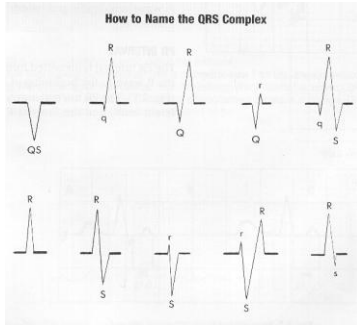
Naming ECG Waves and Segments

- The first negative deflection is the Q wave.
- The first positive deflection the R wave.
- A negative deflection following the R wave is the S wave.
- Large waves are denoted with upper case letters and small waves are given lower case letters.
- If there are more than 2 positive deflections, they are called R and R .
- If there are more than 2 negative waves following the R wave, they are called S and S .

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Naming ECG Waves continued



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